

Claims

- [c1] A multi-source optical module comprising:
an optical circuit that is positioned on a base, the optical circuit having a first and a second optical input;
a first and a second optical source that are positioned on the base relative to the optical circuit; and
a first lens being positioned between an output of the first optical source and the first optical input of the optical circuit, a second lens being positioned between an output of the second optical source and the second input of the optical circuit, at least one of the first and the second lenses being positionable so that the output of a respective one of the first and second optical sources and a respective one of the first and the second optical inputs of the optical circuit are aligned.
- [c2] The optical module of claim 1 wherein the optical circuit comprises an optical integrated circuit.
- [c3] The optical module of claim 1 wherein the optical circuit comprises a discrete-type optical circuit.
- [c4] The optical module of claim 1 wherein the optical circuit is attached to the base with an adhesive material.

- [c5] The optical module of claim 1 wherein the optical circuit is soldered to the base.
- [c6] The optical module of claim 1 wherein at least one of the first and the second optical sources comprises a semiconductor laser.
- [c7] The optical module of claim 1 wherein at least one of the first and the second optical sources is soldered onto the base.
- [c8] The optical module of claim 1 wherein the second optical source is positioned relative to the first optical source on the base so as to increase thermal impedance between the first and the second optical sources.
- [c9] The optical module of claim 1 wherein the first and the second optical sources are positioned so that the first optical source is thermally isolated from the second optical source.
- [c10] The optical module of claim 1 wherein at least one of the first and the second optical sources comprises an array of optical sources.
- [c11] The optical module of claim 1 wherein at least one of the first and the second lenses comprises a silicon lens.

- [c12] The optical module of claim 1 wherein at least one of the first and the second lenses comprises a plastic lens.
- [c13] The optical module of claim 1 wherein at least one of the first and the second lenses are positionable in at least three dimensions.
- [c14] The optical module of claim 1 wherein at least one of the first and the second lenses comprises a positioning member.
- [c15] The optical module of claim 1 wherein the optical module comprises at least one of an optical multiplexer and an optical demultiplexer.
- [c16] A method of manufacturing a multi-source optical module, the method comprising:
attaching an optical circuit to a base of a multi-source optical module;
attaching a first and a second optical source to the base;
positioning a first lens between an output of the first optical source and a first optical input of the optical circuit
and positioning a second lens between an output of the second optical source and a second optical input of the optical circuit; and
manipulating at least one of the first and the second lenses to obtain a desired coupling between a respective

output of the first and second optical source and a respective one of the first and second optical inputs of the optical circuit.

[c17] The method of claim 16 wherein the manipulating the at least one of the first and the second lenses comprises manipulating at least one of the first and the second lenses with a micromanipulator stage.

[c18] The method of claim 16 wherein the manipulating is performed actively.

[c19] The method of claim 16 further comprising fixing at least one of the first and the second lenses in place after the manipulation.

[c20] The method of claim 19 wherein the fixing the at least one of the first and the second lenses in place comprises attaching the at least one of the first and the second lenses to the base.

[c21] The method of claim 16 wherein the attaching the first optical source to the base and the attaching the second optical source to the base further comprise positioning the first optical source relative to the second optical source at a position that increases a thermal impedance path between the first and the second optical source.

- [c22] The method of claim 16 further comprising hermetically packaging the multi-source optical module.
- [c23] The method of claim 16 wherein the manipulating the at least one of the first and the second lenses to obtain a desired coupling comprises manipulating the at least one of the first and the second lenses in at least three dimensions.
- [c24] The method of claim 16 wherein the manipulating the at least one of the first and the second lenses to obtain a desired coupling comprises manipulating the at least one of the first and the second lenses to increase optical transmission through a respective one of the first and the second optical inputs of the optical circuit.
- [c25] A multi-source optical module comprising:
means for attaching an optical circuit to a base of a multi-source optical module;
means for attaching a first and a second optical source to the base;
means for positioning a first lens between an output of the first optical source and a first optical input of the optical circuit and for positioning a second lens between an output of the second optical source and a second optical input of the optical circuit;
means for manipulating at least one of the first and the

second lenses to obtain a desired coupling between a respective output of the first and second optical source and a respective one of the first and second optical inputs of the optical circuit; and
means for fixing the at least one of the first and the second lenses in place.